IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

TAKASHI OHNO, ET AL. : EXAMINER: ANGEBRANNDT, MARTIN J.

SERIAL NO: 09/919,846 :

FILED: AUGUT 2, 2001 : GROUP ART UNIT: 1756

FOR: OPTICAL INFORMATION RECORDING MEDIUM AND OPTICAL RECORDING METHOD:

DECLARATION UNDER 37 CFR 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes Takashi Ohno who deposes and says that:

1. I am one of the joint inventors of the above-identified application.

2. I graduated from Faculty of Science, Tohoku University, Graduate School of Science, Department of Physics, in 1989, and have been in the employ of Mitsubishi Chemical Corporation since 1989 and have been on loan to Mitsubishi Kagaku Media Co., Ltd. New Products Strategy Center since 2003 as Dept. 1 Manager and engaged in research and development of optical information recording media for more than 14 years.

3. I have worked on the following experiments.

Additional Comparative Examples 1 and 2

(1) Preparation of optical information recording media

Optical information recording media A and B having the following layer structures were prepared. The layer structures are the same as that of Example 5 in the specification except for the recording layer composition.

	Optical information recording medium A	Optical information recording medium B
Substrate	Polycarbonate substrate	Polycarbonate substrate
Protective layer	$(ZnS)_{80}(SiO_2)_{20}$ 230 nm	$(ZnS)_{80}(SiO_2)_{20}$ 230 nm
Recording layer	$(Sb_{0.7}Te_{0.3})_{0.9}Zn_{0.1}$ 20 nm	$(Sb_{0.8}Te_{0.2})_{0.9}Zn_{0.1}$ 20 nm
Protective layer	$(ZnS)_{80}(SiO_2)_{20}$ 20 nm	$(ZnS)_{80}(SiO_2)_{20}$ 20 nm
Reflective layer	$Al_{97.5}Ta_{2.5}$ 200 nm	$Al_{97.5}Ta_{2.5}$ 200 nm
Ultraviolet ray-curable resin layer	4 μm	4 μm

(2) Initialization (initial crystallization) of the optical information recording media

The optical information recording media A and B were subjected to melt initialization under the same conditions as in Example 5 [*1] except that the long axis of the elliptic irradiation beam was 1.5 times longer (75 μm), and the laser power was increased by about 1.5 times from 250 mW to 380 mW to offset the longer axis of the elliptic irradiation beam and thereby make the laser power density about the same as that in Example 5, whereby initial crystallization of both optical information recording media A and B was carried out.

*1) The initialization conditions in Example 5

linear velocity:	4.5 m/s
beam-transferring speed:	5 μm/rotation
laser power:	250 mW
long axis of the elliptic irradiation beam:	50 μm.

(2) Formation of recorded marks

On the initialized optical information recording media A and B, EFM signal recording was carried out by means of an optical disk evaluation apparatus (laser wavelength: 780 nm, NA: 0.5) under the same conditions as in Example 5. However, the crystallization rates of the recording layers of the optical information recording media A and B were so high, it was impossible to form amorphous recorded marks under the same conditions as in Example 5.

Next, EFM signal recording (clock period: T = 9.6 nsec) was tried again under different recording conditions, namely, at a linear velocity of 28.8 m/s, by applying writing power Pw (28 mW) and bias power (0.5 mW) in such a manner that when the time for applying writing power Pw is represented by α_1T, α_2T, ..., α_mT, and the time for applying bias power Pb is represented by β_1T, β_2T,..., β_mT (wherein $1 \leq i \leq m$, and α_1, α_2, ..., α_m, and β_1, β_2,..., β_m are defined in Table A), the laser application period is divided into m pulses in a sequence of α_1T, β_1T, α_2T, β_2T, ..., α_iT, β_iT,..., α_mT, β_mT to form amorphous mark portions having a length nT (n = 3 to 11), and by applying erasing power Pe (7 mW) to form crystallized inter-mark portions.

Under the new recording conditions, EFM random signals were recorded on the optical information recording medium A (i.e., amorphous recorded marks were formed), while it was impossible to record signals on the optical information recording medium B. Therefore, only the optical information recording medium A was tested for archival stability of recorded amorphous marks.

Table A

Mark length	m	α_1	β_1	α_2	β_2	α_3	β_3	α_4	β_4	α_5	β_5
3T	1	2.10	0.55								
4T	2	1.00	1.00	1.05	0.3						
5T	2	1.00	1.40	1.45	0.30						
6T	3	1.00	1.00	1.00	0.90	1.05	0.3				
7T	3	1.00	1.35	1.00	1.00	1.4	0.3				
8T	4	1.00	1.00	1.00	1.00	1.00	0.90	1.05	0.3		
9T	4	1.00	1.35	1.00	1.00	1.00	1.00	1.4	0.3		
10T	5	1.00	1.00	1.00	1.00	1.00	1.00	1	0.9	1.05	0.3
11T	5	1.00	1.35	1.00	1.00	1.00	1.00	1.00	1.00	1.4	0.3

(4) Archival stability of recorded amorphous marks

After the optical information recording medium A was left for 100 hours in an environment in which the temperature was 80°C and the relative humidity was 80%, the recorded signals had disappeared.

4. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

5. Further declarant saith not.

Date

Takashi Ohno